1. **Basic Information:**

|  |  |
| --- | --- |
| **Program Title** | All programs |
| **Department Offering the Program** | Basic Science and Engineering |
| **Department Responsible for the Course** | Basic Science and Engineering |
| **Course Title** | Mathematics1 |
| **Course Code** | MTH101 |
| **Year/Level** | Level: 1 |
| **Specialization** | Major |
| **Authorization Date of Course Specification** | - |

|  |  |  |  |
| --- | --- | --- | --- |
| **Teaching hours** | **Lectures** | **Tutorial** | **Practical** |
| 2 | 2 | - |

1. **Course Aims:**

|  |  |
| --- | --- |
| **No.** | **Aims** |
| 1 | Apply knowledge of derivative ( methods and applications) and basics of algebra to solve fundamental problems in engineering. |

1. **Intended Learning Outcomes (ILO’S):**
2. **Knowledge and understanding:**

|  |  |
| --- | --- |
| **No.** | **Knowledge and understanding** |
| A1 | Define concepts and theories of derivative and algebra that necessary for engineering system analysis |

1. **Intellectual Skills:**

|  |  |
| --- | --- |
| **No.** | **Intellectual Skills** |
| B1 | Select appropriate mathematical through differential calculus and algebra based methods for system modelling and analysis |

1. **Professional Skills:**

|  |  |
| --- | --- |
| **No.** | **Professional Skills** |
| C1 | Apply knowledge of mathematics, science, information technology, design, business context and engineering practice integrally to solve engineering problems. |
| C7 | Apply numerical modeling methods to engineering problems. |

1. **General Skills:**

|  |  |
| --- | --- |
| **No.** | **General Skills** |
| D6 | Effectively manage tasks, time, and resources. |

**4. Course Contents:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Topics** | **Lecture** | **Tutorial** | **Practical** |
| * Vectors - Vectors Algebra - partial fractions | **4** | **4** | **-** |
| * The Concept of functions | **2** | **2** | **-** |
| * Equations theory – Mathematical Deduction | **4** | **4** | **-** |
| * Basic Trigonometric functions and its inverse * Exponential and Logarithmic functions * Hyperbolic functions and its inverse * Connection (definition – theories) * Maclaurin expansion * The Taylor series | **4** | **4** | **-** |
| * Numerical solutions methods | **4** | **4** | **-** |
| * Limits, derivatives and curves drawing | **4** | **4** | **-** |
| * Introduction of Partial Derivatives | **4** | **4** | **-** |
| * Linear equations systems – Gauss Jordan method for deletion. | **2** | **2** | **-** |
| **Total** | **28** | **28** | **0** |

**5. Teaching and learning methods:**

|  |  |
| --- | --- |
| **No.** | **Teaching Methods** |
| 1 | Lectures |
| 2 | Discussion sessions |
| 3 | Information collection from different sources |
| 4 | Research assignment |

**6. Teaching and learning methods for disable students:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Teaching Methods** | **Reason** |
| 1 | Presentation of the course in digital material | Better access any time |
| 2 | Wed communication with students | Better communication with certain cases |
| 3 | Asking small groups to do assignments; each composed of low ,medium and high performance students | Knowledge and skills transfer among different levels of students |

7**. Student evaluation:**

**7.1 Student evaluation method**:

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **ILO’s** |
| 1 | Midterm examination | A1, B1 |
| 2 | Semester work | C1,C7,D6 |
| 3 | Final term examination | A1, B1, C1, C7 |

**7.2 Evaluation Schedule:**

|  |  |  |
| --- | --- | --- |
| **No.** | **Evaluation Method** | **Weeks** |
| 1 | Midterm examination | 8th |
| 2 | Semester work | 7th - 9th |
| 3 | Final term examination | 15th |

**7.3 weighting of Evaluation:**

|  |  |  |
| --- | --- | --- |
| **No.** | **evaluation method** | **Weights** |
| 1 | Midterm examination | 20% |
| 2 | Semester work | 20% |
| 3 | Final term examination | 60% |

**8. List of References:**

|  |  |
| --- | --- |
| **No.** | **Reference List** |
| 1 | Swokowski, E , Olinick ,M and Pence, D., Calculus, PWS Publishing Company - Boston, 1994. |
| 2 | Mary Attenborough, Engineering Mathematics, McGraw - HILL Book Company Europe, 1994. |
| 3 | Anthony croft,Robert Davison, Engineering Mathematics A modern Foundation for Electrical ,Electronic & Control Engineering, Addison |

**9. Facilities required for teaching and learning:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Facility** | | | |
| 1 | Lecture classroom | 3 | White board |
| 2 | Seminar | 4 | Data Show system |

**10. Matrix of knowledge and skills of the course:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Topic** | **Aims** | **Knowledge and understanding** | **Intellectual Skills** | **Professional Skills** | **General Skills** |
| 1 | **Algebra**: vectors algebra - partial fractions – equations theory – vectors – mathematical deduction – numerical solutions methods (simple repetitive method – Newton and modified Newton's method – intersection method – False position method – arrays – linear equations systems – Gauss Jordan method for deletion. | 1 | A1 | B1 | C1,C7 | D6 |
| 2 | **Derivation** : function (definition – theories) – basic trigonometric functions and its inverse – exponential and logarithmic functions – hyperbolic functions and its inverse – connection (definition – theories)- limits (definition – theories) - derivatives (definition – theories – higher order types) – curves drawing – mathematical and engineering derivative applications - undefined formulas - Taylor expansion – MacLorean expansion – approximation – introduction in partial derivation | 1 | A1 | B1 | C1, C7 | D6 |

**Course Coordinator: Dr. Ibrahim El shamy**

**Head of Department: Prof. Dr. Mohammed Saad Elkady**

**Date of Approval:**